



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,550	09/15/2003	Eric Cosatto	2000-0042Con	2283
26652 7590 02/04/2009				
AT&T CORP. ROOM 2A207 ONE AT&T WAY BEDMINSTER, NJ 07921				
EXAMINER				
HA/NIK, DANIEL F				
ART UNIT		PAPER NUMBER		
2628				
MAIL DATE		DELIVERY MODE		
02/04/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/662,550

**Applicant(s)**

COSATTO ET AL.

**Examiner**

DANIEL F. HAJNIK

**Art Unit**

2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11/26/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 22-25, 27-32, 34 and 35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-25, 27-32, 34 and 35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/26/2008 has been entered.

***Response to Amendment***

1. The affidavit filed on 11/26/2008 under 37 CFR 1.131 has been considered but is ineffective to overcome the Cox reference. Please see the response to arguments section below for more details.

***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 22-25, 27-32, 34, and 35 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim(s) 22-25 and 27-29 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory

category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

As per independent claim 22, the method, or process, of the claim describes steps to accomplish the claimed method, however each of the claimed steps appears to be an operation that may be performed manually without the use of a machine. In addition, the claim recites an audio/video unit in connection with the selection process, however, it is not required in the performing of the selection step and therefore is neither explicitly structural tied nor inherently involved in the step. The claim language does not require or positively recite any use of a piece of hardware (as one example). For example, the method synthesizes animation. However, there is no mention of, for example, a processor or memory to accomplish any of the claimed method steps. Since positive recitation of such a device or apparatus is absent in the claimed steps, the claim is non-statutory.

As per independent claim 23, the method, or process, of this claim also describes steps to accomplish the claimed method, however each of the claimed steps appears to be an operation that may be performed manually without the use of a machine for the same reasons as claim 22.

As per dependent claims 24, 25, and 27-29, these claims include additional features such as a "first database", a "number of candidate image samples", a "Viterbi search", and "talking-head animation". Each of the claimed steps in these claims appear to be operations that may be performed manually without the use of a machine, i.e. one may perform a Viterbi search using pen and paper to manually write-out calculations. In addition, a database does not necessarily

have to be defined in terms of an electronic computer database. For example, one may have an organization or collection of items written down on papers and this would still be considered a database of information.

Claims 30-32, 34, and 35 are directed to non-functional descriptive material because it merely cites an animation of an object which is essentially image data. Nonfunctional descriptive material that does not constitute a statutory process, machine, manufacture or composition of matter and should be rejected under 35 U.S.C. § 101. Certain types of descriptive material, such as music, literature, art, photographs and mere arrangements or compilations of facts or data, without any functional interrelationship is not a process, machine, manufacture or composition of matter. Thus, the claimed subject matter is nonstatutory.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 22-25, 27, 29-32, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ezzat et al. (NPL document, “Visual Speech Synthesis by Morphing Visemes”, herein referred to as “Ezzat”) in view of Jiang et al. (NPL document, “Visual Speech Analysis with Application to Mandarin Speech Training”, herein referred to as “Jiang”) in view

of Cox et al. (NPL Doc, “Speech and language processing for next-millennium communications services”).

As per claims 22, 23, and 30, Ezzat teaches the claimed “selecting” step on top of 1<sup>st</sup> column on pg. 51 and states:

“there are many intermediate frames that lie between the **chosen viseme images** ...

Consequently, we compute **a series of consecutive optical flowvectors** between each intermediate image and its successor, and **concatenate** them all into one large flow vector that defines the **global transformation between the chosen visemes**”. (emphasis added)

And states in the abstract:

we are able to synchronize the visual speech stream with the audio speech stream, and hence give the impression of a **photorealistic talking face**.  
(emphasis added)

Here, the visemes represent a generic facial image that can be use to describe a particular sound and the flowvectors which contain visual and sound features are used in conjunction with the visemes.

Ezzat does not explicitly teach the claimed “obtaining” step. Jiang teaches the claimed “obtaining” step by stating in the abstract:

**At each frame**, region of interest is identified and **key information is extracted**. The preprocessed acoustic and visual information are then fed into a modular TDNN and combined for visual speech analysis. (emphasis added)

states on (pg. 114, 4.2 Acoustic and Visual Input Representation, 1st paragraph):

**For acoustic data representation**, we have followed the well-established approach to apply FFT on the Hamming windowed speech data to get 16 Melscale Fourier coefficients as input to the Acoustic input Layer. **For visual data representation**,

we have performed the lip-tracking and feature points extraction task by applying our 2D multi-state lip shape model. Then we use both the color profile of the feature points on external and internal boundaries and position and movement of lip boundaries for feature extraction using principle component analysis (PCA). The **extracted feature vectors** are then fed to the Visual Input Layer. (emphasis added)

Here, the Jiang teaches feature vectors (target feature vector) and teaches of visual data (visual features) and acoustic information (non-visual information).

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Ezzat with Jiang in order to provide more analysis data for the speech synthesis process. Ezzat is modified by Jiang by applying the target feature vectors to the phonemes and visemes as used in Ezzat for each frame. For example, the target feature vector may be used in the output frames (labeled "Video") shown in figure 1 of Ezzat.

Ezzat does not explicitly teach the claimed "unit selection process".

Cox teaches the claimed:

Unit selection process in which a longest possible candidate image sample is selected (in figure 2 and bottom of 2<sup>nd</sup> col on page 1318, "There are two good reasons why the method of unit selection synthesis is capable of producing customer-quality or even natural-quality speech synthesis. First, on-line selection of speech segments allows for longer units (whole words, potentially even whole sentences) to be used in the synthesis if they are found in the inventory." In addition, the references teaches of image samples, towards the middle of the 1<sup>st</sup> col on page 1319, "synthesized using photo-realistic two-dimensional image technologies (sample-based

*VTTs)” where the unit selection process is used with these samples because there is a correspondence between the audio and visual TTS).*

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Ezzat, Jiang, and Cox. Cox teaches one advantage of the combination (bottom of 2nd col on page 1318, “There are two good reasons why the method of unit-selection synthesis is capable of producing customer-quality or even natural-quality speech synthesis) where this can improve the output of Ezzat. Ezzat is modified by Cox by applying the unit selection process to select the best image candidate sample or viseme from the collection of possible samples (such as shown in figures 4 and 5 of Ezzat) in Ezzat.

As per claims 24-25, and 31-32, Ezzat teaches the claimed “selecting ... using a comparison of a combination of visual features and non-visual features with the target feature vector” by stating on pg. 47, 2<sup>nd</sup> col, 2<sup>nd</sup> paragraph:

For any input text, we **determine the appropriate sequence of viseme morphs** to make, as well as the rate of the transformations by utilizing the output of the natural language processing unit (emphasis added)

In order to determine the appropriate sequence, the system performs a comparison of visual and non-visual features with a given target vector in order to produce the output as stated. In this case, the visual features are the video images of facial movements of the mouth (for example see figures 4 and 5). The non-visual features are the sounds that correspond to the facial movements (for example what sound a given syllable makes such as a phoneme, see figure 3; also, see the bottom of the 2<sup>nd</sup> col on page 47). Further, this construction process of an appropriate sequence



of viseme morphs would require selecting candidate image samples where these samples could be used to transition between through transformation.

Ezzat teaches the claimed compiling by teaching of concatenation (see quote from top of 1<sup>st</sup> column on pg. 51 above).

As per claim 27 and 34, Ezzat teaches the claimed first database by teaching of recording and collecting one image per English phoneme (bottom of 1<sup>st</sup> column on pg. 47 under “Corpus and Viseme Acquisition”, also see figure 2).

Ezzat teaches the claimed second and third database by teaching of “Flow database” (pg. 54, 2<sup>nd</sup> column), which contain optical flow vectors which specify transition data between visemes (includes visual data and includes storing non-visual data i.e. sound transitions).

As per claim 29, Ezzat teaches the claimed first database in figure 2, the claimed second database and the claimed third database on pg. 54, 2<sup>nd</sup> column under “Flow database” where this database is formed to specify visual and non-visual data between animation transitions (frames).

3. Claims 28 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ezzat in view of Jiang in further view of Cox in further of view of Brand (NPL Document, “Voice Puppetry”, herein referred to as “Brand”).

As per claims 28 and 35, Ezzat does not teach the claimed limitations.

Brand teaches the claimed “selecting ... a number of candidates” and the claimed “Viterbi search” by stating on the bottom half of the 1<sup>st</sup> col on pg. 25:

The Viterbi sequence, while most likely, may only represent a small fraction of the total probability mass—**there may be thousands of slightly different state sequences that are nearly as likely**. If this were to happen in the voice puppet, V would be a very poor representation of the relevant information in the audio, and the animation quality would suffer greatly.  
... These problems are virtually banished with entropically estimated models because **entropy minimization concentrates** the probability mass **on the optimal** Viterbi sequence. (emphasis added)

Brand teaches the claimed calculating concatenation cost by stating on pg. 26, very bottom of 1<sup>st</sup> col and very top of 2<sup>nd</sup> col:

We quantified this with a squared **error measure** of divergence between groundtruth (x) and reconstructed (y) facial motion vectors, **weighted to penalize motions in the wrong direction**. (emphasis added)

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Brand with the combinable system of Ezzat, Jiang, and Cox. Brand teaches the advantage of using an optimal Viterbi sequence with a large number of state sequences (candidates) to reduce the size to the most optimal ones in order to remove poor animation quality (1<sup>st</sup> col on pg. 25 see quote above). Ezzat is modified by Brand by incorporating the Viterbi search of Brand to select the best viseme or image sample to use with the collection of samples in Ezzat.

### ***Response to Arguments***

1. Applicant's arguments filed 11/26/2008 have been fully considered but they are not persuasive.

Applicant argues:

Applicants submit an affidavit under 37 C.F.R. § 1.131 to establish reduction to practice before the August 2000 publication date of Cox et al. in Proceedings of the IEEE, Vol. 88, No. 8, and diligence until the filing date.

(upper middle of page 2 in filed response, emphasis added).

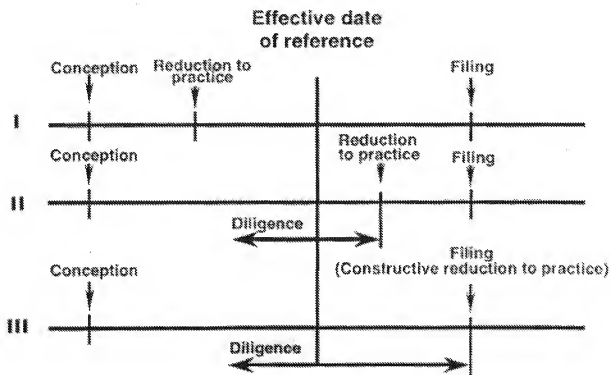
The examiner respectfully maintains that this statement itself is confusing and not correct. The statement is confusing as to exactly which way the applicant intends to prove prior inventorship.

As quoted by the applicant at the bottom of page 2 in the remarks, 37 CFR 1.131(b) states:

The showing of facts shall be such, in character and weight, as to establish reduction to practice prior to the effective date of the reference, or conception of the invention prior to the effective date of the reference coupled with due diligence from prior to said date to a subsequent reduction to practice or to the filing of the application  
(emphasis added)

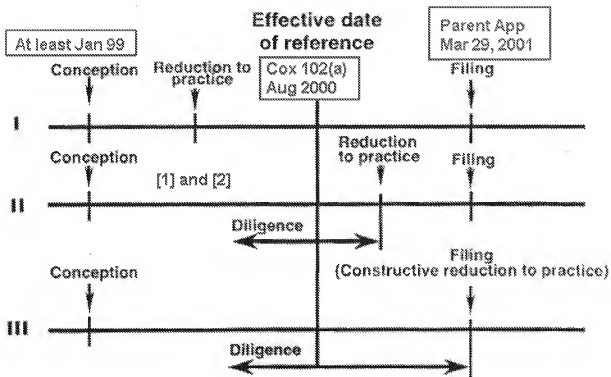
According to the rule, there are three separate ways of showing prior inventorship. The following chart also illustrates these three ways more clearly:

## Three ways to show prior inventorship



The next chart illustrates the facts and dates supplied by the applicant thus far from their affidavit and remarks:

## Three ways to show prior inventorship



[1] Draft Parent appl approved Mar 17, 2000

[2] Disclose sent to outside counsil Apr 4, 2000, receipt Apr 12, 2000

According to the applicant's remarks filed, the applicant established reduction to practice before the August 2000 (upper middle of page 2 in filed response). This would imply that the applicant intends use method I in the chart above for showing prior invention. However, also according to the applicant's remarks filed, the applicant stated that they are showing diligence until the filing date. This would imply that the applicant intends to use either method II or III in the chart above.

However, according to the chart shown, one cannot have both a reduction to practice before the August 2000 publication and diligence, because diligence is defined, within the context of 37 CFR 1.131, to be a time period sometime before the August 2000 publication to a later date of reduction to practice.

Since, it unclear which method is being applied, the examiner will consider each separately. First, for method I, the evidence would have to provide that the applicant established reduction to the practice sometime before the Aug 2000 Cox publication. According to the MPEP, establishing actual reduction to practice requires the need of a real-world physical construction of the invention. For example, see MPEP section 2138.05 in the section titled: "II. REQUIREMENTS TO ESTABLISH ACTUAL REDUCTION TO PRACTICE". The following is stated: "The same evidence sufficient for a constructive reduction to practice may be insufficient to establish an actual reduction to practice, which requires a showing of the invention in a physical or tangible form that shows every element of the count. *Wetmore v. Quick*, 536 F.2d 937, 942, 190 USPQ 223, 227 (CCPA 1976)."

The applicant's affidavit dated 11/26/2008, states that a draft disclosure was written and completed around Mar to Apr of 2000 (in exhibits II and III). However, as stated above, the "The same evidence sufficient for a constructive reduction to practice may be insufficient to establish an actual reduction to practice". The filing of an actual patent with a disclosure is a constructive reduction to practice. The disclosure itself does not necessarily mean that actual reduction to practice has occurred. Since a draft disclosure is a written document stating how an invention works, it does not in-itself show "the invention in a physical or tangible form that

shows every element of the count". Thus, based on the information provided thus far, the affidavit does not show the requirements for method I of prior inventorship.

Next, one must look at the case in regards to the remaining methods of II and III for showing prior inventorship. Since, the affidavit does not provide any evidence of a physical or tangible form of the invention in the time period after the Aug 2000 Cox publication to the time of filing of the parent application, it appears that method II does not apply in this case (see the chart above for an illustration using timelines).

Method III does not require an actual reduction to practice but rather a constructive reduction to practice (the filing of a patent application). The applicant, in this case, does have proof that a constructive reduction to practice occurred on Mar 29, 2001 (the filing of the parent patent application). Thus, the additional requirement of diligence must be considered.

In particular, the requirement of diligence must be considered from the time period of right before Aug 2000 to Mar 29, 2001 according to method III. The applicant discussed diligence from the bottom of the page 3 to the top of page 5 in the remarks. The applicant correctly points out that the time period in question for diligence is about 8 months (at the top of page 4 in the remarks). The applicant argues that the present application is 20 pages (counting drawings) and includes 21 claims, and that during the 8 months in question, reasonable diligence had been applied (bottom of page 4 in remarks).

However, the remarks and affidavit are absent of details in this particular regard. For example, while exhibits II and III of the affidavit establish that the draft disclosure was sent to Wendy Koba with receipt, the affidavit itself is absent any information of what occurred after Mar-Apr 2000. In other words, the affidavit does not at all address the 8 month time period of

diligence. The applicant remarks state that Wendy Koba started working diligently on the application starting on July 31, 2000 (bottom of page 4 in remarks). Applicant only provides a conjecture; i.e. "For example, suppose Wendy Koba could not begin working on the application up until July 30, 200, and started working diligently to prepare and file the application starting on July 31, 2000." Applicant further makes the statement that Wendy Koba prepared this application with reasonable diligence without any supporting evidence.

In regards to the situation mentioned above, if one has a draft copy of the disclosure already, it is unclear as to why it would take at least 8 additional months to prepare the parent application from a draft disclosure. The remarks and affidavit do not provide this information. In addition, it is not up to the office or examiner as to guess whether diligence during the 8-months time period occurred. For example, one cannot tell whether Wendy Koba had additional other work during this time period, or whether that work is related to the application in question. The applicant also provides case law in support of preparing an application over a time period of 10 months; however, the case law itself does not provide actual facts of what occur for this particular application. Thus, it appears that the applicant has not met the conditions for method III of showing prior inventorship because facts are missing or not provided during the time period of diligence.

Also consider the following from the MPEP:

MPEP 715.07(a) Diligence

Where conception occurs prior to the date of the reference, but reduction to practice is afterward, it is not enough merely to allege that applicant or patent owner had been diligent. Ex parte



Hunter, 1889 C.D. 218, 49 O.G. 733 (Comm'r Pat. 1889). Rather, applicant must show evidence of facts establishing diligence.

MPEP 2138.06 "Reasonable Diligence"

DILIGENCE REQUIRED IN PREPARING AND FILING  
PATENT APPLICATION

The diligence of attorney in preparing and filing patent application inures to the benefit of the inventor. Conception was established at least as early as the date a draft of a patent application was finished by a patent attorney on behalf of the inventor.

Conception is less a matter of signature than it is one of disclosure. Attorney does not prepare a patent application on behalf of particular named persons, but on behalf of the true inventive entity. Six days to execute and file application is acceptable. *Haskell v. Colburne*, 671 F.2d 1362, 213 USPQ 192, 195 (CCPA 1982). See also *Bey v. Kollonitsch*, 866 F.2d 1024, 231 USPQ 967 (Fed. Cir. 1986) (**Reasonable diligence is all that is required of the attorney. Reasonable diligence is established if attorney worked reasonably hard on the application during the continuous critical period. If the attorney has a reasonable backlog of unrelated cases which he takes up in chronological order and carries out expeditiously, that is sufficient. Work on a related case(s) that contributed substantially to the ultimate preparation of an application can be credited as diligence.**).

Applicant has not shown at least the highlighted part.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL F. HAJNIK whose telephone number is (571)272-7642. The examiner can normally be reached on Mon-Fri (8:30A-5:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel Hajnik/  
Patent Examiner  
Art Unit 2628

/XIAO M. WU/

Supervisory Patent Examiner, Art Unit 2628